SECRET

THE WORLD-WIDE IMPORTANCE OF USSR SCIENCE

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~~I. A summary.~~

Soviet science has a distinctive character. It differs from the old Russian science not only in scope but in direction and, in many cases, in content. Scientific research, ~~the search for new paths to knowledge of nature and society,~~ in technology and in agriculture, has become an important and obligatory task of the state. All branches of our science have one great common goal--the development of creative investigative thought in the various branches of science and technology for the service of our country, for the solution of the great social problems which confront her.

Especially great has been the role of science in pioneering the ~~way~~ road to a communistic society. "Science is essential for the great developments of natural resources and industry, to provide for the needs of man in a communist society."

Looking back to the distant past, we see how our science was dependent on foreign ~~six~~ science. We see also how rapidly our science became independent, how our people produced from their midst giants of learning. And in the Soviet years there has been developed a great army of Soviet scientists; our science is stronger and more independent than ever before.

For centuries preceding the Great October Revolution conditions for the development of science in our country were unfavorable. The normal growth of science in Russia was for a long time disrupted by the Tatar-Mongol invasion, and by the great burden of Byzantine religious stagnation and conservatism.

For centuries the abilities and the inclinations of the Russian people had no organized outlet. The turning point came only under Peter I, when at last science was taken out from under the tutelage of the church, secular schools were established, and in 1724 there was created the Petersburg Academy of Sciences, the cradle of a new outstanding Russian science.

In no country in the world was there such a sudden advance in science as in Russia at the beginning of the 18th century. The appearance of Lomonosov was the Russian people's answer to the new conditions.

In the works of Lomonosov, Russian science became a new source of discoveries of world-wide significance. The law of the constancy of mass in chemical changes, the atomic theory of heat phenomena, the existence of atmosphere on the planet Venus, the theory of the origin of icebergs in the Arctic, -- these are some of the contributions of Lomonosov to world science. At present the international position of Lomonosov as a scientist ~~mmmmmmm~~ is evident to every competent and objective scientific authority, ~~in all countries.~~ the world.

The outstanding role of the young Petersburg Academy was further evidenced by the geographic, botanical and ethnographic discoveries of a contemporary of Lomonosov, S.P. Krasheninnikov, ~~the~~ son of a soldier and like Lomonosov, educated in the Moscow Slavic-Greek-Latin Academy. His basic work was "A Geographic Description of Kamchatka", published in four volumes in 1756 and soon translated into French, German and Dutch.

Besides their ~~mmmm~~ public recognition of ~~the~~ achievements of Russian scientists, the scientists of western Europe sometimes ~~mmmm~~ quietly made use of them, or even took credit for ~~them, for~~ the works themselves. This happened, for example, in the discovery of the voltaic arc between carbon electrodes. This is ascribed by foreign literature to the famous chemist, Davy, as having first ~~obtained~~ discovered the arc in 1810. Actually it was described in detail by the Petersburg academician V.V. Petrov in his book published in 1803. A year later,

~~in announcing~~ in announcing the subject for an international prize, the Petersburg Academy had again in detail described the voltaic arc in an accompanying prospectus in French and German, which was sent to all ~~the~~ scientific institutions of the world. Thus there can be no doubt that ~~the~~ discovery ~~of V.V. Petrov~~ had been ~~made use of~~ in western Europe.

In the 19th century, despite ~~the~~ difficult conditions for science under Tsarist Russia, scientific achievements of undeniably world-wide significance were so numerous that only a few examples can be given.

~~The following is rearranged and condensed to give first the name of each scientist, followed generally only by the the achievements with which he is credited~~

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LOBACHEVSKIY, N.I. Worked out a non-Euclidean version of geometry; his conclusions were significant not only for mathematics but also for the philosophical concept of space, and for modern physics, in connection with the theory of relativity. ~~His name in science stands along with those of Copernicus and Einstein.~~ He, ~~like the others mentioned above,~~ came from ~~the ranks of the~~ ordinary Russian provincial people.

OSTROGRADSKIY, Academician. A contemporary of Lobachevskiy. Famous for researches in mathematical physics, mechanics, and astronomy. Independently of the Englishman, Hamilton, he established the principle of least action. Honored by election to membership in the academies of sciences of Paris, Rome, Turin and Washington.

CHEBYSHEV, P.L., Academician. Made extremely valuable contributions in the fields of mathematical analysis,

the theory of numbers, the theory of probabilities, and the theory of mechanisms.

KOVALEVSKA, S. V., The first woman in the history of of science; a distinguished representative of the exact sciences; famous for her theory of the rotation of solid bodies.

LENTS, E. Kh. [sic; Lenz, E.H.; from the following, apparently H.F.E. Lenz is meant.] His classic researches in electromagnetism must be mentioned first among the achievements of our science in the 19th century which had a tremendous effect on world science. Lenz's law is known to every student.

STOLSTOV, A.G. Played a great role in the founding and development of the science of the electric effects of light; established in Moscow the basic laws and characteristics of photoelectric processes.

BREDIKHICH, F.A., Academician. Renowned for his researches on the tails of comets and meteor trails. Director, at the end of the 19th century, of the Pulkovo Observatory at Petersburg, whose astronomers held first place in the world in the middle of the century, and which was for a time the "astronomical capital of the world".

MENDELEYEV, D.I. Deep and fundamental was the significance of Russian science in the development of world chemistry in the 19th century, and to Mendeleyev belongs the greatest discovery in the history of chemistry: that of the periodic law of chemical elements.

ZININ, N.N., a professor of chemistry of Kazan. Discovered aniline, which introduced a new era in organic chemistry and chemical technology.

BUTLEROV, A.M., Academician. Another distinguished Kazan chemist. The theory of the structure of organic compounds owes much to him, particularly as corroborated by the isomerism discovered by him of hydrocarbon compounds. In the 19th century his textbook on organic chemistry, compiled on the basis of his theory, was studied not only in Russia, but abroad as well.

Great and significant were the contributions of our science to world technology in the 19th century.

YAKOBI, B.S. Invented and thoroughly worked out galvanoplastics. With the name of this scientist, physicist and engineer are linked the realization of the electric telegraph, the construction of the first motor boats, and the development of an electric blasting (elektrominnoye delo)

Russian scientists, physicists and engineers may justly be called the founders of electric illumination. I have already mentioned the discovery of the voltaic arc by Petrov.

YABLOCHKOV, P.N. a Russian engineer, was the designer of a famous light (svecha) which in the 70's of the last century attracted world-wide attention.

LODYGIN, A.N. was the inventor of the first incandescent lamp with a carbon filament heated in a vacuum. This invention was repeated, put to practical use, and perfected by Edison.

POPOV, A.S., Professor. Discovered radio in 1896 in Russia.

TIMIRYAZEV, K.A. His brilliant experiments to a great extent disclosed the main characteristics of the absorption of carbon dioxide from the air by green leaves under the influence of light, and gave a beginning to the subject

of the physiology of plants in connection with photo-synthesis.

SECHENOV, I.M., and PAVLOV, I.P., represent the Russian school of physiology which pioneered the way for the rest of the world in the study of higher nervous activity.

VINOGRADSKIY, S.N., his work on nitrogen-fixing bacteria, IVANOVSKIY, D.I, his discoveries of filterable viruses, and MECHNIKOV, I.I., in various works, are Russian biologists who have had a great influence on world science.

PRZHEVAL'SKIY, MIKLUKHLO-MAKLAY, and SEMENOV-TYANSHANSKIY are world-renowned for their geographical discoveries.

By the beginning of the 20th century, Russian science had become an extremely important factor in world science. Despite the apparent unwillingness of many foreign scientists to take into account these obvious facts, the numerous attempts to deny priority in great discoveries even to Lobachevskiy, Mendeleyev and Popov, and the systematic avoidance of Russian scientists in the awarding of the international Nobel prizes, Russian science had a ~~greater and greater~~ influence ~~on the course of world~~ science.

The first years of this century, ~~before the revolution,~~ were likewise marked by scientific achievements of world-wide importance.

The Moscow physicist P.N. LEBEDEV first reported and made it possible to measure the pressure of light on solids and gases. This did much to clear the way for an understanding of the nature of light and gave a key to the understanding of basic problems in astronomy.

Academician B.B. GOLITSYN created the new science of seismometry, for the study of earthquakes, and devised instruments, methods and theories of seismometry which

soon spread and were adopted throughout the world.

Academician A.N. KRYLOV was the author of the first universally adopted theory of ship construction.

In the works of A.P. KARPINSKIY, F.N. CHERNYSHEV, V.I. VERNADSKIY and others, Russian descriptive and theoretical geology developed on a wide front.

Prof. M.S. TSVET discovered a remarkable new method, called chromatography, of analyzing and classifying organic compounds, the importance of which may justly be compared with that of spectral analysis.

However, pre-revolutionary Russia, not long freed from serfdom, and under the oppression of the Tsarist regime, ~~did not~~ provide ~~much that was~~ needed for ~~the for the~~ full development of science. This was provided only under ~~the power of the~~ Soviet rule. In 30 years under the Soviets, science in our country has grown as never before; the number of persons engaged in scientific research is 50 times ~~what it was~~ greater than before the revolution, constituting a scientific army of about 100,000. The Soviet Union now has more than a thousand special scientific research institutions in various fields of science and technology. Every year a greater portion of the state budget is alloted to this work. There have been developed specialists in branches of science in which before the revolution there was often not a single one in the whole country.

There has been an extraordinary growth in the importance of Soviet science for the whole world. Great libraries, with colossal collections of scientific materials, are a heritage not only of our own country but of the world. In this material are recorded some achievements of tremendous significance.

Soviet mathematics, in many divisions of the theory of numbers, the theory of probabilities and topology

occupies one of the leading placed in the world, and the mathematicians of the world follow the works of such Soviet leaders in this field as Academicians I.M. Vinogradov, S.N. Bernshtein, A.N. Kolmogorov, P.S. Aleksandrov, and N.M. Krylov.

Soviet physics has contributed to world science new facts and theoretical generalizations of ~~prime~~ ~~first~~ prime importance. The phenomenon of the combination dispersion of light was discovered in the USSR by Academicians L.I. MANDEL'SHTAM and G.S. LANDSBERG simultaneously with the Indian physicist, RAMAN. This discovery opened a new way to the study of the internal structure of the molecule and to its analysis. Academician P.L. KAPITSA discovered the astonishing property, "superfluidity", of liquid helium. The physicists A.A. FRIDMAN and V.A. FOK are to be credited with important theoretical conclusions connected with the theory of relativity. Our science has made basic contributions in the field of non-linear oscillation which have great importance for radio ~~technology~~ engineering and mechanics. With these developments in this field are associated the names of Academicians L.I. MANDEL'SHTAM, N.D. PAPALEKSI, A.A. ANDRONOV, N.M. KRYLOV and N.N. BOGOLYUBOV.

Academician N.N. SEMENOV has done important research on chain chemical reactions and on the general subjects of the kinetics of reactions. Academician A.N. TERENIN's works on these chemical reactions taking place under the influence of light are of great significance, as are the numberous ~~ones~~ works of Academicians A.N. FRUMKIN and P.A. REBINDER on the phenomena of surface activities.

The experiments of Academician D.V. SKOBEL'TSYN with the Wilson chamber installed in a ~~vacuum~~ magnetic field occupy a unique place in research on cosmic rays and ~~the~~ in nuclear physics, ~~of the nucle~~

The latest researches of Academician A.I. ALIKHANOV and A.I. ALIKHANYAN, active member of the Academy of Sciences of the Armenian SSR, on cosmic rays opens the possibility of a new understanding of the nature of the forces which are hidden in the nucleus of the atom.

Soviet biologists have done work of world-wide importance in agricultural science. The scientists I.V. MICHURIN, and B.R. VIL'YAMS, and the Academicians D.N. PRYANISHNIKOV, T.D. LYSENKO and N.V. TSITSIN have pioneered in the science of the development of soil and vegetation.

The works of the Soviet physiologists Academicians L.A. ORBEL' and A.D. SPERANSKIY and Profs. I.P. RAZENKOV, E.A. ASTRATYAN, P.K. ANOKHIN and K.M. BYKOV hold a leading place in the world.

Remarkable for daring and originality were the research on the North Pole by a group of Soviet physicists headed by Academician O. Yu. SHMIDT, and the memorable drift on an ice floe of the [IVAN DIMITRIYEVICH] PAPANIN expedition party.

In the extensive list of Stalin prizes for science for 1947 we note, along with the discoveries of A.I. ALIKHANOV and A.I. ALIKHANYAN, the successful experimental researches on superconductivity by Prof. A.I. SHAL'NIKOV, and the brilliant contributions to world science of the mathematicians, Prof. N.G. CHEBOTAREV, Academician V.I. SMIRNOV, and Prof. G.N. GOLUZIN. Soviet chemistry, headed by Academician N.D. ZELINSKIY and Prof. N.I. GAVRILOV, made a great advance in the study of albumin, solving the problem of the interrelationship and connection between the cyclic and chain-form groupings of the albumin molecules.

[E] The articles closes with further stressing the importance of science in the progress of the Soviet people toward a communist society, and cites the trust expressed by Stalin on February 9 1946 that Soviet science would be able not only to overtake, but in the near future to surpass, the achievements of science beyond the Soviet borders.